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On Frost-Drift in North Carolina.—Prof. W. C. KERR remarked that there are some peculiar features in the surface geology of North Carolina which have not hitherto been accounted for. We have no true glacial drift, or at least none well characterized. But besides the ordinary quaternary gravels which overlie a large section of the coastward half of the State, there are found, chiefly on the flanks and among the foothills of the Blue Ridge, and over a considerable portion of the Piedmont region, beds of earth and stones which are characterized by a peculiar arrangement of their materials, explicable neither on the theory of their being morainal nor modified drift. Reference was made to the subject in the North Carolina Report of last year, and a theory suggested; but as illustrations were wanting, it was not practicable to do more, and he should require the blackboard now to make the matter intelligible. He represented, in a diagram, the succession of different arrangements of the detrital materials as they may be seen in descending the slopes on which these accumulations are found. All our gold gravels come under this description of quaternary deposit. In one part of the diagram the arrangement which obtains in the higher portions of the deposits, nearest the source of the materials, was represented. The lower part, perhaps one-half or one-third of the vertical depth, is filled with angular and little worn fragments of quartz and other hard rocks; the upper part being simply unstratified earth. As we descend the slope, the angular blocks have become more rounded, and are accumulated in a successively lower and more crowded stratum, at last hugging closely the surface of the underlying rock. In the case of the auriferous gravels, the gold is found, of course, only on the upper slopes, and near the sources of the materials, its greater specific gravity insuring its speedy descent to the bottom of the moving mass. It is perfectly obvious, both from the position of these beds on the slopes of hills and mountains, up to 1500 feet above the sea, and from their arrangement, that they have not been deposited under water. And it is equally evident that they are not true glacial drift; and, indeed, they are readily traced, in many cases, to their sources, distant only a few rods, or even feet. But he had not hit upon the solution of the question of the origin and mode of accumulation of these beds until he had accidentally found in a railroad cut near Morganton, the structure indicated in the second diagram, where a small quartz vein was represented rising up, undisturbed, through the underlying strata of rock, in a nearly vertical direction, until it reaches the lower surface of the deposit in question, where it is seen to be suddenly interrupted, and its materials—angular fragments—strewn along the surface of the rock, down the slope a distance of several yards. A close study of this phenomenon at last suggested the theory which he had proposed of *frost drift*. It is obvious that in subglacial regions (and in glacial regions in subglacial times) the annual frosts of winter would penetrate to a

great depth; and likewise the summer thaws, aided by the enormous precipitation which characterized those regions and times. And it is equally obvious that a mass of water-saturated earth, in freezing and thawing, must be subject to the same laws of movement as a true glacier, the rate of motion being proportioned to the quantity of water. The depth of some of these deposits at first presented a difficulty, this depth rising in some cases to twenty and even thirty feet, although they are for the most part less than half that depth. But after learning that in Vermont, in the winter of 1874-5, the frost penetrated to a depth of eight feet, and that in Siberia and other subarctic regions the ground is annually frozen and thawed to a much greater depth, there seemed to remain no part of the phenomena presented by these beds which is not satisfactorily accounted for by the theory.

The occasion of his bringing this subject to the attention of the Academy was this: In passing an excavation on Market Street, above Forty-Fourth Street, he had observed a new and striking confirmation of the view just presented. In an accumulation quite like those already described as occurring in North Carolina, this additional feature was observed: several banded seams of decomposed mica schist, standing nearly vertical in the undisturbed rock below, on reaching the lower edge of the drift were bent at a sharp angle, in the direction of the movement of the mass, down the slope, and were traceable many feet, diminishing with a gradual and regular taper in a horizontal direction, until lost in the homogeneous mass of earth which formed the body of the bed. How this happened is obvious enough on the theory given, but on no other known to him.

AUGUST 8.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

On the Diurnal Opening of Flowers.—MR. THOS. MEEHAN referred to observations he had made this season on the nocturnal and diurnal expansion of flowers, and said that, contrary to the popular impression, it was not probable that light or its absence alone determined the opening of the blossoms. There were some plants, as, for instance, *Oenothera biennis*, the evening Primrose; *Anagallis arvensis*, the "Pimpernel," and others, which remained open or otherwise longer when the weather was humid or cloudy, and were looked on in consequence as kinds of floral barometers; but from other facts it was clear that it was not the weather merely, but some other incident accompanying the weather that governed the case.

For instance, though *Oenothera biennis*, and other *Oenotheras*,